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THE HOME PREPARATION OF FRUIT CANDY

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THE HOME PREPARATION OF FRUIT CANDY

W. V. CRUESS[1] AND AGNES O'NEILL[2]

INTRODUCTION

According to a recent industrial census made by the National Confectioners' Association about 825,000 tons or about 13¾ pounds per capita of commercially prepared candy is consumed in the United States annually. In addition a large amount of home-made candy is prepared. Most of either kind contains little or no fruit.

Many candies are improved by the addition of fruit and several excellent candies consisting entirely or principally of fruit can be made.

The recipes in this circular are intended for use in preparing small quantities of candy for home use, or small commercial quantities with household equipment for local sale, and are not intended for use by wholesale candy manufacturers. However, the underlying principles of the various processes are the same for both large scale and home preparation, and the directions given can be modified in most cases to suit the needs of the commercial manufacturer. Retail candy makers can use many of the recipes without modification. The information presented in this circular is the result of experiments conducted in the Fruit Products Laboratory of the University of California.

Healthfulness of Fruit Candy.—While most candies are wholesome, the addition of an appreciable proportion of fruit, on account of its composition, increases not only their palatability, but also their healthfulness.

Fruits contain invert sugar, which is readily digested; mineral salts that tend to counteract the acidity resulting from a meat and cereal diet; fruit acids that are beneficial to health; and some fruits an important amount of vitamin C, which is of particular value to children.

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EQUIPMENT

Most of the equipment required is to be found in any kitchen. In addition to the usual kitchen equipment, a candy thermometer is very desirable for most candies and necessary for some, and a syrup hydrometer is very useful in the candying of fruit.

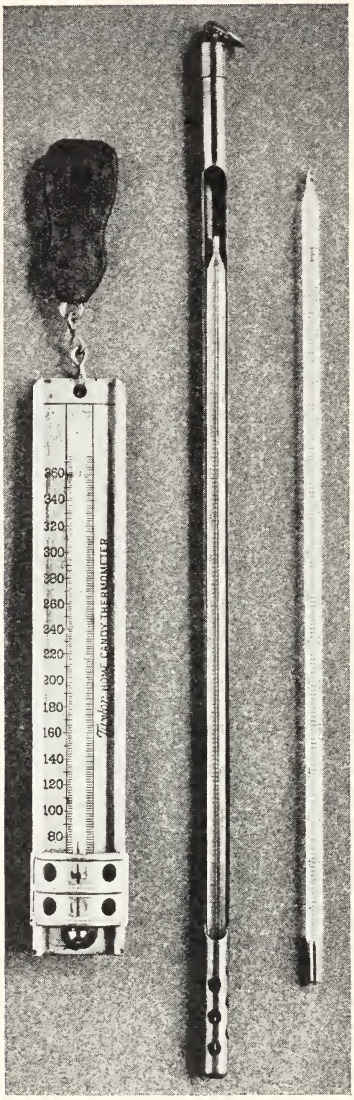

Fig. 1.—Thermometers suitable for use in small-scale candy making.

Thermometer.—An ordinary Fahrenheit chemical thermometer having a solid glass stem and reading to 300° F is satisfactory. This can be purchased through a drug store from any chemical supply house for about $1.50.

There are also available in hardware stores and in some grocery stores candy thermometers made especially for household use. Low-priced dairy thermometers reading to 300° F can be used if standardized in boiling water. This is done by immersing the bulb of the thermometer for about two minutes in boiling water and reading

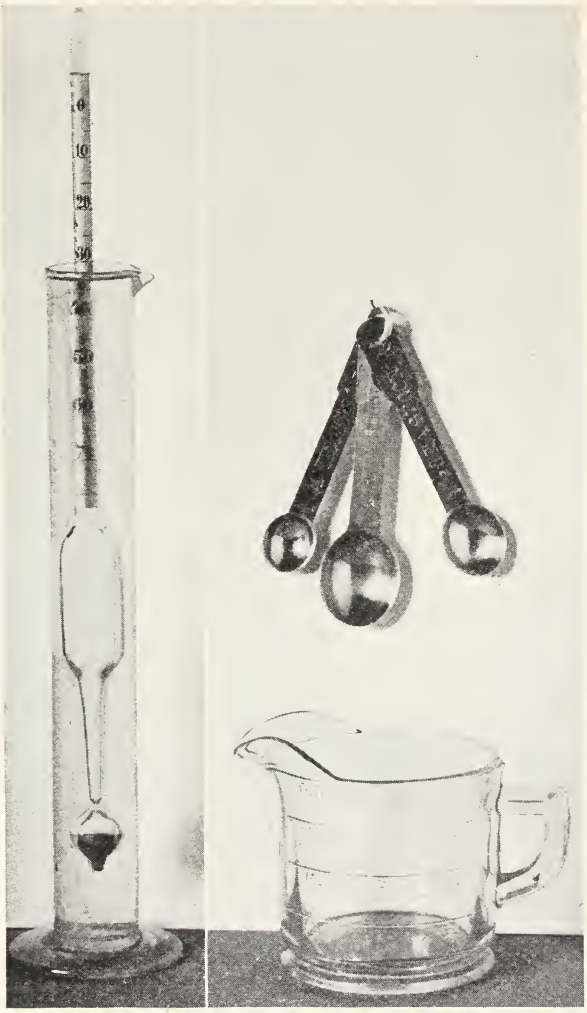

Fig. 2.—Syrup hydrometer, measuring spoons, and measuring cup.

the boiling point accurately while the thermometer bulb is immersed in the actively boiling water. Water should boil at about 212° F, at or near sea level; in using the thermometer add to or subtract as the case requires, from the temperatures recommended in the recipes the number of degrees which the thermometer is in error. Three suitable thermometers are shown in figure 1.

Syrup Hydrometers.—Hydrometers are used in testing syrups during candying of fruits. These are of many forms and are sold under several different names, such as saccharometer, sugar tester, and salometer. The Balling and Brix hydrometers indicate the percentage of sugar and are best for home use. A tall cylinder made for the purpose and shown in figure 2 or a tall jar such as a green olive jar or tall narrow flower vase is necessary for holding the syrup. The

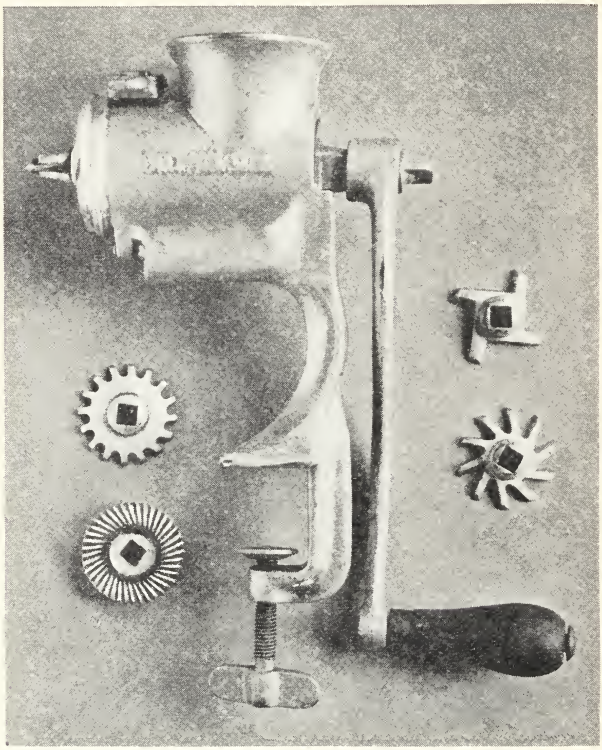

Fig. 3.—Small-size food grinder. The nut-butter blade is shown at lower left.

hydrometer costs about $1.50 and the cylinder about 50 cents. Both are obtainable from any chemical supply house through a drug store.

A Baumé hydrometer with a scale of 0–50° may be used instead of the Balling hydrometer. Balling degrees divided by 2 approximately equal Baumé degrees. Thus 70° Balling is approximately 35° Baumé. (The exact Baumé reading in this case is 37.5°, but the 2.5° Baumé error is not important in making candy in the home.)

Evaporator.—For candying fruit in the home a small fruit dryer is desirable. A home-size drier that can be made for less than $5.00 is fully described in a recent circular.[3]

[3] Cruess, W. V., and Lillian D. Clark. The home evaporator. University of California Agricultural Extension Service Circular (unnumbered), 1925.

Other Equipment and Supplies.—Stew pans, several shallow baking pans, a small food grinder (fig. 3), large kitchen spoons, a measuring cup, and a set of measuring spoons are needed for the preparation of most candies. Some food grinders become clogged and do not grind dried fruit satisfactorily. A grinder that will take the blades shown in figure 3 should be used. Powdered sugar, corn starch, fruit pectin, and fruit acid, either tartaric or citric, are necessary in some cases and will be mentioned in the recipes as required. Sugar, either cane or beet, and corn syrup are needed in practically all recipes. Several grades of corn syrup are available. For home use any good brand of white corn syrup obtainable from any grocery is suitable; in preparing larger quantities for sale, a good grade of confectioners' glucose syrup should be used.

CANDIES IN WHICH FRUITS MAY BE USED

The kinds of candy in which the use of fruit has proved most satisfactory in our experiments are the following:

1. Candied fruit is that which has been impregnated with a heavy syrup containing cane sugar and glucose and drained and dried.

2. Glacé fruit is candied fruit dipped in a very heavy syrup and dried to impart a glossy finish.

3. Fruit jelly candy is made by cooking fruit juice or pulp with sugar and sufficient pectin, agar agar, or other jellying substance to give a stiff jelly on cooling. It may be coated with chocolate or fondant or may be simply dusted with powdered sugar to overcome stickiness.

4. Divinity fudge with fruit is prepared by boiling a mixture of corn syrup and cane sugar to 252° F and beating into this syrup white of egg and fruit.

5. Chocolate fudge with fruit is prepared by boiling chocolate, corn syrup, sugar and milk to 238° F and adding butter, salt, fruit and nuts.

6. Panoche with fruit is prepared by boiling brown sugar, corn syrup, milk and salt to 238° F, adding butter, beating until stiff, and adding fruit and nuts.

7. Fondant with fruit may be made in one of two ways; the fondant may be prepared by boiling corn syrup and sugar to 240° F, cooling, creaming by stirring and then mixing with fruit; or the corn syrup, sugar, and fruit may be cooked to the fondant point (240° F), cooled, and creamed.

8. Caramel with fruit is prepared by boiling corn syrup, sugar, and cream to 242° F, adding fruit, butter, and nuts, and boiling to 248° F.

9. Nougat with fruit is prepared by boiling corn syrup and sugar to 280° F, beating egg white into the hot syrup and adding fruit and nuts.

10. Marshmallow with fruit is prepared by boiling gelatin and corn syrup to 250° F, and beating powdered sugar and fruit into the resulting syrup.

11. Fruit brittle is prepared by boiling corn syrup and cane sugar to 275° F–280° F, adding butter, fruit, and small amounts of salt and baking soda.

12. Popcorn crisp with fruit is prepared by boiling syrup and sugar to 285° F, and adding butter, salt, popcorn, and fruit.

13. Uncooked fruit candies are prepared in a number of different ways such as grinding dried fruits and mixing with chopped nuts to give fruit bars; mixing ground dried fruits with a small amount of baking soda to give puffed fruit bars; stuffing dried fruits with fondant, or coating various forms of dried fruits with chocolate or fondant.

14. Other fruit candies, such as stuffed hard candies, Turkish paste, gum drops, and jelly beans require special equipment or their preparation is not well adapted to home use.

GENERAL METHODS

Several processes, such as casting candies in starch, coating with chocolate, and the preparation of fondant, are used in preparing a number of different fruit candies and in order to avoid repetition will be discussed first.

Casting in Starch.—Casting in starch consists in pouring liquid or plastic candy material such as marshmallow or pectin fruit juice center material into molded depressions in dry starch held in trays or shallow pans and allowing the candy to harden. Some candies must be dried in place in the starch at about 120° F for several hours to harden them sufficiently to permit handling, but most fruit candies do not require such drying. After hardening, the candy and starch are separated by screening.

For household use any good grade of corn starch is satisfactory. The principal requisite is that the starch be dry, in order that it will not adhere in undue quantities to the candy.

The starch may be placed in a layer about one inch deep in shallow pans or in wooden forms. Depressions of the desired form and size may be made in the starch by means of any suitable instrument, such as a large thimble or knife handle. Figure 4 illustrates a tray of starch and depressions made with a small butcher knife handle. If the starch is thoroughly dry, little difficulty will be encountered in making the depressions of smooth form and uniform depth. With continued use the starch becomes moist and must then be dried in a slow oven.

Fruit-jelly centers of various kinds, marshmallows containing fruit juice or finely ground fruit pulp, and thin fondant containing fruit juice or fruit pulp can be satisfactorily cast in starch and fruit centers

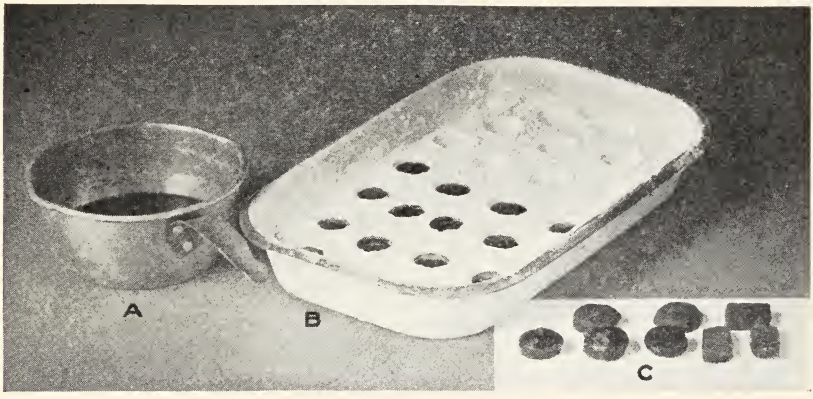

Fig. 4.—Equipment for casting fruit candy centers in starch in the home. A, pan of melted center material; B, pan of starch showing depressions and some of the candy in place; C, fruit jelly centers after hardening and separation from the starch.

formed in this manner are drier at the surface and more easily dipped in chocolate than the same materials allowed to harden in sheets and cut in pieces before dipping.

The following procedure has been successful: The candy is first cooked to the desired temperature and given any other preliminary treatment necessary. It is then poured carefully while still hot into the starch molds and allowed to stand overnight to harden. The pieces are then separated from the starch by means of a colander or coarse sieve. They are then brushed free of starch and dipped in chocolate or dusted with powdered sugar. They may also be coated with granulated sugar after moistening with water or syrup.

If the candy fails to solidify properly on standing twenty-four hours, the trays or pans of starch with the candy in place may be

placed in a small evaporator or in a very slow oven and the candy dried until firm enough to handle on cooling. A temperature below 140° F should be used.

Pouring and Hardening.—In many of the recipes the directions "pour and allow to harden" are given. In the home this usually consists in pouring the hot or warm candy such as fudge or jelly center material into an oiled or buttered pan or platter and allowing it to harden long enough to be cut and handled. Instead of the pan or platter a marble slab may be used.

Chocolate Coating of Fruit Candies.—Fruit candies may be chocolate coated in the same manner as cream centers.

There are three general kinds of chocolate coating, sweet, milk, and bitter chocolate, and also a number of different qualities of each. Milk chocolate does not mask the delicate flavor of fruit candy centers to such an extent as do bitter chocolate and plain sweet chocolate.

For household use various brands of dipping chocolate are available at grocery stores. Ordinary bar chocolate such as is used in making chocolate beverages is not suitable because it melts at too high a temperature and is not smooth enough in texture. If the quantity of candy to be made is large enough, confectioners' dipping chocolate is best. This may be purchased direct from confectioners' supply houses in ten pound slabs. In preparing fruit candy on a small scale, from one-third to one-fourth of a pound of dipping chocolate is required for each pound of dipped fruit candy.

Melting the chocolate requires great care. If it reaches too high a temperature the coating on cooling will be streaked with gray of a very unattractive appearance. The method usually recommended for household use is as follows: cut the chocolate into small pieces and place in a stew pan. Heat a large pot of water nearly to boiling for sweet chocolate and to about 140° F for milk chocolate and remove from the fire. Set the small pan containing the chocolate in the hot water and stir the chocolate until melted—at no time must it be allowed to reach a temperature much above that of blood heat, that is about 100° F. Stirring with the hand makes it easy to control the temperature. If the chocolate becomes too warm remove it at once. At all times moisture must be kept out of the chocolate, as moisture causes it to turn gray.

When the chocolate is completely melted, remove it from the hot water bath and allow to cool to about 85° F, or until it becomes thick

enough for dipping purposes. It may be poured onto an oiled marble slab, which will cool it quickly to the dipping temperature of about 85° F, or may be used in the pan in which it was melted.

During cooling it should be worked with the hand to break up small lumps and to render the coating as smooth as possible. When it has begun to harden at the edges it is ready to use. Most beginners make the mistake of using the coating while it is still too warm and too thin. If it is too thin when cooled to dipping temperature a teaspoonful of vanilla extract to the pound of chocolate may be added to thicken it; if too thick, it may be thinned to any desired degree by adding a small amount, usually about one teaspoon to the pound, of salad oil, melted butter, or melted oleomargarine.

The surface of the centers must be dry before dipping, and the temperature of the room and of the centers about 65–70° F. If the centers are too cold the coating may turn gray; if the temperature is too high it will be too thin or will fail to harden.

Professional candy dippers take the piece of candy in the fingers; roll it in the melted chocolate for an instant; remove it with the middle finger and thumb and place it on oiled paper; and as it is released, hold the point of the thumb above it for an instant, moving the thumb so that the string of melted chocolate dripping from it forms a design on the surface of the coating. In the home the candy may be dipped in the chocolate with a fork and placed on waxed or oiled paper to harden. When the chocolate becomes too thick through cooling, more of the warm, melted chocolate may be added.

Coating with Fondant.—Some fruit candies are improved by coating with fondant. Two recipes for preparing dipping fondant in the kitchen will be given.

(*a*) With cream of tartar.—One of the best fondants for home use is made with cream of tartar and sugar as follows: cook a syrup of 2½ cups of granulated sugar and 1½ cups of water slowly until the sugar is dissolved. Add ¼ teaspoon of cream of tartar.

Boil until a few drops placed in cold water and removed may be formed into a soft ball or until a candy thermometer indicates a boiling point of 238–240° F.

Remove the pot from the fire, cool to about 110° F (that is, until lukewarm), and manipulate the syrup with a stiff kitchen spoon or wooden paddle until it forms a creamy mass. Place in a jar or pan and cover with a damp cloth until used. It will keep for several weeks. This recipe is more difficult than (*b*). (See page 12.)

(*b*) With corn syrup.—Any good grade of household corn syrup may be used, although confectioners' glucose is preferable.

Household recipe	Semicommercial formula
1½ cups of sugar	5 lbs.
¼ cup of corn syrup	¾ lb.

Cook the mixture to 238–240° F, or to a soft ball (see recipe *a*). Pour it on a slab or into a shallow pan. Allow it to cool to about 110° F, then manipulate until fondant forms. Store it as directed in (*a*).

To coat fruit candies with fondant, place the desired amount of fondant in a double boiler and heat. When the water in the outer kettle begins to boil, stir the fondant constantly and remove the double boiler from the flame. Stir the fondant until it is well melted but still white and creamy. Do not allow the temperature to become too high or it will form a very hard coating or become a clear syrup; a temperature of about 120° F is satisfactory. Vanilla flavor may be added if desired.

With a fork, dip the fruit candy pieces into the melted fondant; allow any surplus fondant to drain off and place the candy on oiled paper to harden. About one hour after dipping loosen the candy to permit drying of the bottom. Allow to stand overnight before packing.

Fondant coatings become very hard in time, and the candy should be consumed within a few days.

Relation Between Boiling Point of Syrups and Common Practical Tests.—In candy making it is desirable to use an accurate thermometer with which to determine the end point of the boiling process. Some candy makers and many housewives, however, do not use a thermometer and rely on the well-known test of dropping a small quantity (about a teaspoonful) of the boiling syrup into a pan of cold water and examining the chilled sample. As the boiling point increases the syrup becomes more concentrated and the chilled sample becomes firmer. The following approximate relation between the thermometer and the practical test has been found to exist. The boiling point of the syrup is affected by altitude, being less at higher elevations than at sea level. Boiling points are given in the table for sea level, 2000 feet, and 4000 feet; the boiling points at other elevations are in proportion.

RELATION OF ALTITUDE TO THE BOILING POINT OF SYRUPS USED IN CANDY MAKING*

Practical test	Boiling point		
	At sea level	At 2000 ft.	At 4000 ft.
Light string	226° F	222° F	218° F
Heavy string	230° F	226° F	222° F
Soft ball	238° F	234° F	230° F
Medium ball	240° F	236° F	232° F
Stiff ball	244° F	240° F	236° F
Hard ball	250° F	246° F	242° F
Light crack	254° F	250° F	246° F
Brittle crack	275° F	271° F	267° F
Hard crack	290° F	286° F	282° F

* After Rigby, W. O., Reliable candy teacher, pp. 39, 40. Rigby Publishing Company, Topeka, Kansas.

Those who are familiar with the use of scientific instruments will obtain better results by using the thermometer as a guide. However, many housewives use the water test, or "ball test," as it is sometimes known, very successfully.

CANDIED AND GLACÉ FRUITS

In the candy trade there is no clear distinction between the terms "candied" and "glacé," and the two are applied more or less indiscriminately to the same product. See definitions on page 7.

a) *Preparing the Fruit.*—Use firm, ripe fruit. Peel peaches, pit, and cut in half. Peel pears, cut in half, and core. Stem and pit cherries, Royal Anne preferred (see also special directions for Maraschino candied cherries, page 16). Do not pit apricots, plums and prunes, but puncture to the pit in several places with a silver fork. Figs (Kadota preferred) require no treatment. Puncture jujubes thoroughly to the pit in several places with a silver fork or slit the skin lengthwise in several places. Cut oranges, lemons, and grapefruit in half and scoop out the pulp, retaining the peels only for candying; citron (a fruit) cut in half lengthwise; scoop out the pulp and store the peels three weeks in a brine of 1 pound of salt to the gallon of water.

Canned fruit, preferably of fancy or choice quality, is excellent for use in preparing candied fruit. Drain off the syrup; to each two cups of syrup add one cup of corn syrup, return it to the fruit and boil the fruit and syrup for three minutes. Let it stand 24 hours; then proceed as directed in (*c*) on page 14.

b) *First Boiling.*—The object of the first boiling is to modify the texture of the fruit so that it will absorb the syrup without shrivelling.

Boil orange, lemon, grapefruit, and citron peels in water until soft—about 60 minutes. With grapefruit and citron peels six or seven changes of water are necessary to get rid of bitterness. When the peels are thoroughly cooked and tender, place them in the first syrup described below, boil 5 minutes, and set aside for 24 hours.

Boil other fruits until tender in a light syrup consisting of 1 cup of corn syrup or confectioners' glucose and 3 cups of water. The time will vary greatly with the variety of fruit. Plums, freestone peaches and apricots will require 15 minutes or less; pears, clingstone peaches and firm figs, 20–40 minutes. In any case boil the fruit until tender, but not until soft and mushy. To avoid excessive evaporation during boiling cover the pot. Set the fruit and syrup aside in a stoneware jar or other convenient vessel, such as an agateware pot or dishpan for 24 hours. If the fruit floats, place on it a weight such as a dinner plate or wooden float to keep it submerged.

c) Second Boiling.—About 24 hours after the first boiling, drain off the syrup and if a Balling hydrometer is available test the syrup. Prepare a mixture of equal parts of cane sugar and corn syrup or confectioners' glucose. To mix, warm the corn syrup or glucose until thin, add the sugar and mix thoroughly. Add enough of this mixture, well stirred, to the syrup from the fruit to increase the Balling degree to 35–40° Balling, the test being made after the sugar has dissolved.

If a hydrometer is not available merely measure the syrup from the fruit and to every 4 volumes (4 cups) add 1 volume (1 cup) of the mixed corn syrup and sugar and mix well.

Add the fruit to the syrup and boil the mixture from 2 to 3 minutes. Return it to the storage vessel and allow to stand 24 hours.

d) Subsequent Boilings.—At 24-hour intervals drain the syrup from the fruit and add enough of the corn syrup and sugar mixture to increase the Balling to 50, 60, 70, and 74° Balling on successive days. Boil the syrup and fruit together each day for 2–3 minutes and return it to the storage vessel. If a Balling hydrometer is not used, measure the syrup each day and add 1 cup of the mixed corn syrup and sugar to 4 cups of the syrup and repeat daily until the syrup is very thick, about like strained honey.

e) Storage in Final Syrup.—Store the fruit in the final syrup of 74° Balling (or as thick as honey) for at least two weeks to permit the fruit to become as plump as possible. If at any time during this storage even the slightest evidence of fermentation or molding occurs, heat the fruit and syrup to boiling for 2–3 minutes. If crystals of cane sugar appear, heat until they dissolve.

f) *Drying.*—After two weeks storage or longer in the final syrup, remove the fruit. Dip it momentarily in hot water and drain it free of adhering syrup.

Place it on screen trays, such as window screen tacked to wooden frames, and allow to dry until of about the texture of commercially packed candied fruit.

A better method is to dry on screens in an evaporator[4] or dehydrater at 120–130° F until of the desired texture. Usually from 4 to 6 hours is required. Pack in candy boxes after drying.

g) *Pectin Glacé.*—Fruit prepared as described under (*f*) will be more attractive in appearance and less apt to develop a coating of sugar crystals if coated with a dilute pectin solution.

Dissolve 1 level tablespoonful of dry pectin in 1 quart of water by heating and stirring and allow to cool; or dilute any good household pectin syrup with two volumes of water.

Remove the fruit from the final syrup in (*e*); dip momentarily in hot water; drain to remove the excess syrup. Dip in the pectin solution, which should be at room temperature. Drain and dry until no longer sticky; about 24 hours at room temperature or two or three hours at 130° F.

h) *Preservation of Fruit in Final Syrup.*—The fruit will keep in the final syrup indefinitely, if the syrup and fruit are brought to boiling and sealed scalding hot in fruit jars or cans. No further treatment is necessary.

The cans or jars may be opened later, the fruit drained, dried, and glacéd as previously described. Preserving factories and canneries could use this method of distributing fruit for candying purposes to candy makers and housewives. It has been used successfully in the Fruit Products Laboratory since 1921.

i) *Utilizing the Surplus Syrup.*—The relatively large amount of syrup remaining after candying may be used in candying subsequent lots of fruit or in making jelly or candy or as a table syrup. It may be made into jelly by using ⅔ cup of the syrup instead of each cup of sugar ordinarily used in jelly making.[5]

Fondant may usually be made from the syrup as follows: add a pound of sugar to each pound of syrup, cook to 240–242° F (medium ball), cool to about 110° F and stir vigorously until the syrup grains or creams; work to a smooth fondant and flavor with ground candied

[4] See reference, page 6.

[5] Directions for jelly making will be found in California Agricultural Extension Service Circular 2, Home preparation of jelly and marmalade.

fruit, or with vanilla. Occasionally the sugar of the syrup used in candying is inverted (decomposed) and the syrup fails to cream properly. For this reason it is desirable to first prepare a small lot of fondant from the syrup. Syrup not suitable for fondant may be used for jelly making or on the table.

j) Spoiling of Candied Fruit.—Candied fruit may mold if not sufficiently dried before packing.

On long storage it may become hard or filled with sugar crystals. Boil such fruit in water until tender and put it through the complete candying process as previously described for fresh fruit.

It may shrivel during the syrup treatment—usually an indication of insufficient cooking during the first boiling. Place such fruit in water; boil and allow to stand until tender and plump and return to the syrup, proceeding with the candying process in the usual manner.

Candied fruit in boxes sometimes becomes infested with insects. In order to avoid such spoiling it should either be used within six weeks or two months after packing or should be packed in insect-proof containers.

Special Directions for Candied Cherries, Maraschino Style.[6]—Candied cherries are usually artificially colored and flavored. In order that the fruit shall absorb the color properly it must be given a preliminary treatment in sulfurous acid solution. On a small scale this can best be done as follows:

Use firm ripe Royal Ann Cherries. Do not stem. Place in a stoneware crock or glass fruit jar with glass top or in wooden kegs. Prepare the following solution:

1 gallon of water.
1 oz. (about 2 level tablespoons) of sodium bisulfite (from a drug store or camera shop).
½ oz. (about 1 level tablespoon) of citric acid.
6 ozs. (⅔ measuring cup) of salt.

Dissolve all ingredients and cover the cherries with the solution. Seal in fruit jars (glass-top kind only can be used), or cover in stoneware jars and leave two weeks or longer.

Discard the solution. Stem and pit the fruit. Boil it in 5 or 6 changes of water until free from sulfur taste and until tender.

Prepare a "first syrup" as for other fruits, but add red food color obtainable from a grocery store in order to give a tint about like that of ordinary Maraschino cherries. To each gallon of syrup add also 1 level teaspoonful of citric acid.

[6] Furnished by J. H. Irish.

Proceed from this point as with other fruit to the final syrup; adding more red color from time to time, if needed.

When the final syrup is reached add a little (not too much) wild cherry flavor. Store two weeks. Drain and proceed as with other candied fruit. Instead of the red, a green food color may be used and instead of wild cherry, mint flavor may be added.

FRUIT JELLY CANDIES

In experiments conducted since 1920, we have found that excellent candies of jelly-like consistency and full fruit flavor can be made from any tart fruit juice or fruit pulp by the addition of fruit pectin and sugar and boiling to the jellying point. Fruits deficient in acid require the addition of fruit acid such as citric or tartaric.

With Fruit Juice.—Tart juices of pronounced flavor such as loganberry, Eastern grape, plum, and blackberry are to be preferred to juices lacking in flavor and acid.

To extract berry and grape juices, crush and boil the fruit in its own juice from 3 to 4 minutes and drain through a jelly bag. Slice apples and other firm fruits and add enough water to cover. Boil until soft. Drain through a jelly bag. Cut oranges in half and express the juice without heating. To juices lacking in acidity, add 1 pint of lemon juice or about ½ ounce (1 level tablespoon) of citric acid to the gallon. Raspberry, peach, pear, and strawberry juices usually require this acidification.

(*a*) With commercial pectin syrup:

	Household Recipe	Semicommercial Formula
Fruit juice	1 cup	2 quarts
Sugar	¾ cup	3 lbs.
Corn syrup or confectioners' glucose	¾ cup	3 lbs.
Pectin syrup	½ cup	1 quart

Mix the fruit juice and pectin syrup. Add the sugar and corn syrup. With a candy thermometer inserted boil to 222°–223° F, or until a strong jelly test is obtained as indicated by sheeting of the liquid as it is allowed to drip from a spoon. Remove from the fire. Add one-fourth cup of chopped nuts to each cup of the jelly after boiling is completed, if desired.

Pour into starch molds or into oiled pans. The depth should be about ½ inch. Allow to harden 24 hours. Remove the cast pieces from the starch molds and brush off adhering starch. Cut sheets in pieces of suitable size. Dust with powdered sugar or dip in chocolate or fondant as directed on pages 9, 10, and 11.

(*b*) With powdered pectin: prepare a pectin solution as follows:

	Household Recipe	Semicommercial Formula
Water	2 cups	2 quarts
Powdered pectin, pure	2 level tablespoons	½ cup

If the pectin contains 50 per cent sugar and 40–50 per cent pectin, use twice the quantity indicated.

Heat in a double boiler or at 180–200° F until dissolved. Measure and make to original volume by adding water. Mix well and use in the same manner as pectin syrup in recipe (*a*).

With Pulp of Fresh or Canned Fruit.—Cook berries or grapes in their own juice until soft. Slice firm fruits, add water to cover, cook until soft, and rub through a sieve or screen. Cut oranges in half; extract the juice; grind one-fourth of the peel fine; add the ground peel to the juice with an equal volume of water; cook soft; and rub through a screen. Rub canned fruit through a screen or colander without heating. Pie-grade fruit is best for the purpose and costs the least.

To fruit pulps lacking in acid add 2 tablespoons of lemon juice to each cupful of pulp. Pears, oranges, peaches, prunes, and figs require acid or lemon juice; apricots, sour berries, guavas, and plums do not. After the pulp has been prepared proceed as with fruit juice. See page 17.

With Dried Fruits.—Dried fruits may be boiled in water until soft and rubbed through a screen. They may then be used in the same manner as described for fresh or canned fruit pulps. It is also possible, although not so satisfactory, to use them in the following manner:

	Household Recipe	Semicommercial Formula
Finely ground dried fruit	1 cup	3 lbs.
Cane sugar	1 cup	3 lbs.
Corn syrup	½ cup	1½ lbs.
Pectin syrup or pectin solution (p. 17)	1½ cups	4½ pints
Water	½ cup	1½ pints
Chopped nuts	½ cup	1½ pints

Mix well all ingredients except nuts. Cook to 222°–223° F, or until a stiff jelly test is obtained. Add the nuts and pour in oiled pans or on a slab to cool and harden. Cut into pieces of suitable size and coat with sugar or chocolate.

Coating of Fruit Jelly Centers.—The various fruit-jelly centers previously described can be coated with chocolate or fondant by the methods described on pages 10 and 11. It is necessary that the surface

of the candy be dry at the time of dipping. It is usually possible to dry the cut pieces sufficiently by exposing them to the air for a few days on trays made of ordinary window screen. In locations where drying conditions are not favorable, the small home evaporator mentioned on page 6, or other dryer may be used. In such cases dry the candy at not above 130° F, for from 3 to 4 hours; cool to room temperature, and dip in the usual manner. Starch cast pieces usually do not require additional drying.

Fruit juice jelly centers are improved by double dipping; first in fondant, then in chocolate. Allow the fondant coating to harden for about one hour before dipping in chocolate.

DIVINITY FUDGE WITH FRUITS

One of the most satisfactory fruit candies is that made with divinity fudge as a base (fig. 5, A). However, this candy soon becomes hard, and therefore should be eaten within a week after it is made.

With Dried Fruits and Nuts.—All varieties of California dried fruits were found satisfactory. The fruit should be chopped or coarsely ground in a food chopper. If raisins are used about one-half should be chopped or ground and the remainder used whole. The following formula was found satisfactory:

	Household Recipe	Semicommercial Formula
Sugar	1 cup	5 lbs.
Corn syrup or confectioners' glucose	2 tablespoons	10 ozs.
Water	½ cup	2½ pints
Egg whites (beaten stiffly)	1	10
Chopped walnuts or almonds	¼ cup	1¼ pints
Chopped or ground dried fruits	⅓ cup	1½ lbs.

Cook the sugar, corn syrup, and water to 252° F, or to a "light crack." Add the syrup gradually to the stiffly beaten white of egg, beating the mixture until stiff.

Then add the nuts and dried fruit and beat until well mixed. Pour on an oiled pan or marble slab to harden overnight. Cut into pieces of convenient size. These may be dipped in milk chocolate if desired.

With Candied Fruits.—Broken pieces of candied fruit unsuitable for packing as such, may be coarsely ground and substituted for the dried fruit in the foregoing formula.

With Citrus Fruits.—Use oranges or grapefruit or a mixture of two parts orange to one of grapefruit. Grind the whole fruit medium fine in a food chopper. Measure the ground fruit. Add an equal

volume of water and boil until the peel is soft, adding more water during boiling if needed. Boiling for 30 minutes will usually be sufficient. Add sugar equal to the original volume of the fruit. Cook to a stiff jam or to a boiling point of 222° F.

Add the jam in the same proportion as in the divinity dried fruit recipe on page 19, but before the finishing temperature is reached; then cook to 252° F and proceed as directed for dried fruits.

CHOCOLATE FUDGE WITH FRUITS

Chocolate fudge is more easily made than divinity, but its flavor does not blend so well with that of the fruit. For the recipe given below the operator may substitute any good chocolate fudge recipe. Like other forms of fudge, fruit fudge must be used fresh.

With Dried Fruits.—Dried apricots because of their tartness and pronounced flavor give better results than do other common dried fruits.

	Household Recipe	Semicommercial Formula
Sugar	4 cups	5 lbs.
Condensed milk	1½ cups	2 pints
Corn syrup or glucose syrup	⅔ cup	¾ lb.
Bar chocolate	¼ lb.	¾ lb.
Butter	3 teaspoons	¼ lb.
Dried fruit (chopped) (raisins whole)	1½ cups	2 lbs.
Chopped walnuts or almonds	⅔ cup	¾ pint
Salt	¼ teaspoon	¾ teaspoon

Cook the sugar, milk, corn syrup, salt, and chocolate to 240° F or to a medium ball. Add the butter and cool slightly. Stir until nearly stiff enough to pour and then stir in the nuts and fruit. Pour into an oiled pan to harden.

With Other Fruit Products.—Ground candied fruit or citrus fruit jam prepared as described for use in divinity fudge, page 19, may be substituted for the dried fruit in the above formula. The fruit is added when the candy has reached 238° F, the mixture is then boiled again until 240° F is reached. Cool and treat in the usual manner.

PANOCHE WITH FRUIT

The flavor of panoche is less pronounced than that of chocolate fudge and does not mask the fruit flavor to such an extent. As with fudge any good panoche recipe or formula may be substituted for the one given. Panoche is best when fresh as it soon becomes hard.

With Dried Fruits.—Prepare dried fruits as described for divinity fudge; see page 19.

	Household Recipe	Semicommercial Formula
Brown sugar	4 cups	5 lbs
Condensed milk	⅔ cup	¾ pint
Corn syrup or glucose syrup	⅔ cup	¾ lb.
Butter or oleomargarine	3½ teaspoons	3 oz.
Chopped almonds or walnuts	1 cup	1¼ pints
Chopped or ground dried fruit	2 cups	2½ lbs.
Salt	¼ teaspoon	¾ teaspoon

Cook the sugar, salt, corn syrup, and milk to 238° F (soft ball). Add the butter. Cool it to about 110° F, then beat until nearly stiff enough to pour. Add the nuts and fruit, stir in well, and pour.

With Other Fruit Products.—Other fruit products such as chopped candied fruits or citrus fruit jam prepared as directed for divinity fudge may be substituted for dried fruit. These should be cooked with the other ingredients to 238° F instead of being added after the other ingredients have reached 238° F.

FONDANTS WITH FRUIT

We have found that fondant can be used to advantage with several different fruit products such as dried fruits, syrups, preserves, canned fruits, etc., if variations in the fondant formula are made to suit the character of the fruit product.

Cold Mixing of Fondant and Fruit.—A fondant is first made and allowed to ripen for a day or two before addition of the fruit. Dried fruit, ground fruit preserves drained of syrup, chopped candied fruit, and fruit syrups can be used. The candy is best if finally dipped in chocolate. Any good fondant may be used if it is not too soft. We have used the following formula among others and have found it satisfactory:

	Household Recipe	Semicommercial Formula
Sugar	1½ cups	5 lbs.
Corn syrup	¼ cup	1 lb.
Water	⅓ cup	1¼ pints

Cook to 238–240° F or to a soft ball. Cool to about 110° F and beat or stir to a stiff, creamy consistency. Place in a jar and cover with a moist cloth for several hours or longer.

To each cupful of fondant add from ¼ to ¾ cup of chopped or ground dried fruit and about half as much chopped nuts as fruit. More of "bone" dry fruit than of very moist dried fruit can be used.

Chopped candied fruit may be substituted for the dried fruit.

Fruit syrups of various kinds may be used to flavor the fondant, berry syrups being particularly desirable for this purpose. To prepare the berry syrup proceed as follows: Crush the berries. Heat them to boiling in their own juice, and strain through a cloth bag. Measure the juice and to each cup add two cups of sugar. Heat this syrup to boiling for two minutes, cool, and use ¼ cup of it to each cup of fondant, or more of the syrup if it does not cause the fondant to become too soft. The fruit syrup is added after the fondant is finished. Allow to stand several hours. Form into balls and dip in chocolate.

Fruit jams made as follows may be used in the same manner. Grind the fresh fruit and measure it. Cook it until soft in its own juice or with a little water. Add sugar equal to twice the volume of the original crushed fruit. Cook it to a very heavy jam or to a boiling point of 225° F. Use about ¼ to ⅓ cup of the jam to each cup of the fondant.

Casting Fruit Fondant in Starch.—Fondant prepared as in the foregoing recipe can be melted over a pan of hot water, then mixed with the proper amount of finely ground dried fruit, fruit syrup, or finely ground fruit preserves, and cast in starch molds as described on page 8. After hardening, these pieces may be dipped in chocolate.

Fruit Fondant by Cooking Fruit with the Fondant.—A number of recipes, most of them new, in which the fruit, sugar, corn syrup, etc., were cooked together to the fondant stage, cooled, and creamed were developed in our experiments. Of these the following proved the most satisfactory:

(a) With preserved fruit:

	Household Recipe	Semicommercial Formula
Sugar	1½ cups	6 lbs.
Corn syrup	2 tablespoons	½ lb.
Water	⅓ cup	1¼ pints
Chopped walnuts or almonds	¼ cup	1 pint
Ground preserved fruit	½ cup	2 lbs.
Fondant—prepared as directed on page 12	⅓ cup	1¼ lb.

Cook the sugar, corn syrup and water to 245° F or a stiff ball; add the fruit and cook to 240° F or medium soft ball. Cool to about 110° F, beat until creaming begins, add the fondant and nuts and stir until well creamed.

(*b*) With canned fruit: Proceed exactly as with ground preserved fruit, except that for the preserved fruit is substituted the ground canned fruit mixed with its own syrup. Use in the household recipe

¾ of a cup of the canned fruit and in the semi-commercial formula 2½ pints. Add the fruit at the beginning of the cooking and cook to 240° F, or a medium soft ball. Cool, add the fondant, and cream by vigorous stirring.

(*c*) With dried fruits: Proceed as with the preserved fruit in recipe (*a*) except that ½ cup of finely ground dried fruit is substituted for the preserved fruit in the household recipe and 1½ pounds of dried fruit in the semicommercial formula. The dried fruit need not be cooked with the other ingredients but may be added with the nuts and fondant after the syrup has been cooked and cooled.

(*d*) With powdered milk: The addition of 3 level tablespoonfuls of powdered milk in the household recipe and of about 8 ounces in the semicommercial formula improves the flavor and texture of the candy.

The dried milk is added with the fondant after the fruit and other ingredients have cooled and is beaten into the mixture during the creaming process. It adds considerably to the food value of the candy by virtue of its high content of protein and vitamins A and B.

"Puffed" Fruit Fondant.—In experiments conducted in the Fruit Products Laboratory by Kenneth McLeod, it was found that the texture of the fruit fondant could be greatly improved by adding during the beating process a small amount of baking soda (sodium bicarbonate). This reacts with the acid of the fruit to give carbonic acid gas and results in "puffing" or "raising" of the candy, imparting to it a fluffy texture which is held when the candy hardens (fig. 5, D). The proportion of the various ingredients can be varied considerably, although the following proportions gave the best results in our experiments:

	Household Recipe	Semicommercial Formula
Sugar	1½ cups	5 lbs.
Corn syrup	¼ cup	¾ lb.
Water	⅓ cup	1 pint
Dried fruit, chopped or ground (if fruit is moist, use less)	1 cup	2 lbs.
Chopped walnuts or almonds	½ cup	1½ pints
Baking soda	½ teaspoon	1 tablespoon

Cook the sugar, corn syrup, and water to 242° F (medium soft ball). Add the fruit and nuts. Beat until thick. Add the baking soda and beat until light. Pour on an oiled pan or slab to cool and harden. The candy is improved by chocolate dipping.

FRUIT CARAMELS

While the flavor of most fruits is considerably masked by that of the caramel, we found that some fruits, particularly dried pears, apricots, and figs, and the citrus fruit jam described on page 19, gave excellent results when added to caramel candies.

	Household Recipe	Semicommercial Formula
Sugar	1 cup	2 lbs.
Chopped walnuts or almonds	¼ cup	½ pint
Corn syrup	⅔ cup	1¼ lbs.
Ground dried fruit	½ cup	1 lb.
Butter or oleomargarine	1 teaspoon	2 oz.
Cream (whipping)	1 pint	2 quarts

Cook the sugar, corn syrup, and one-half of the cream to 238° F (soft ball); then add one-half of remaining cream and cook to 242° F (medium ball); add remaining cream, dried fruit, butter, and chopped nuts, and cook to 248° F (firm ball). Pour into an oiled pan or onto a slab to cool and harden.

FRUIT NOUGAT

Nougat is more difficult to prepare than the candies previously discussed and considerable practise is usually necessary before thoroughly satisfactory results are obtained. Unless properly prepared it will either be soft and sticky or will be tough. Dried or candied fruits are to be preferred to other fruit products for use in nougat.

It was found necessary to considerably alter published recipes in order to make the inclusion of an appreciable proportion of fruit possible.

The ingredients are prepared in two separate lots and then mixed after cooking.

Lot 1	Household Recipe	Semicommercial Formula
Sugar	¾ cup	1 lb.
Corn syrup	6 tablespoons	½ lb.
Water	⅓ cup	⅓ pint
Egg whites	2	6

Cook the sugar, corn syrup, and water to 252° F (hard ball). Beat the egg whites and add the boiling hot syrup. Beat together until fairly stiff.

Lot 2	Household Recipe	Semicommercial Formula
Sugar	⅞ cup	1¼ lbs.
Corn syrup	3 teaspoons	¼ lb.
Water	¼ cup	¼ pint

Cook to 280° F (brittle crack), and add to lot 1. Beat the two syrups together until light and stiff. Then add:

	Household Recipe	Semicommercial Formula
Butter or oleomargarine (melted)	2 tablespoons	3 ozs.
Chopped walnuts or almonds	½ cup	½ pint
Chopped, dried or candied fruit	⅔ cup	¾ lb.

Beat until well mixed and light. Pour on oiled paper or slab to harden.

FRUIT MARSHMALLOWS

Marshmallow candy, because of its light texture, permits the addition of rather a large proportion of fruit (fig. 5 A). There are several good published marshmallow recipes, any one of which may be substituted for the following, which was used successfully in our experiments.

	Household Recipe	Semicommercial Formula
Powdered or granulated gelatin (best obtainable and free from objectionable flavor)	3 tablespoons	4 ozs.
Water, hot	½ cup	1 pint
Corn syrup	1½ cups	2½ lbs.
Powdered sugar	1½ cups	2½ lbs.
Dried apricots, figs, prunes, or pears chopped, or raisins whole)	1½ cups	3 lbs.

Dissolve the gelatin in the hot water. Cook the corn syrup to 250° F (hard ball). Beat into it the dissolved gelatin and powdered sugar until the mixture is light. Flavor with vanilla. Then add the dried fruit. Beat a short time and pour on oiled paper or a slab to harden.

When the dried fruit is used in the amount recommended, the marshmallow acts merely as a "binder." Less fruit may be used if desired. Fruit syrup may be used instead of dried fruit: ⅔ cup in the household recipe and ¾ pint in the semicommercial formula. Fruit preserves finely ground may also be used in the same proportions. Berry syrups prepared as directed on page 22 are particularly desirable for use in marshmallows.

FRUIT BRITTLES

Chopped dried fruits or whole raisins can be added to brittle to replace part or all of the nuts ordinarily used. The dried fruit must be quite dry; if very moist the candy will be sticky.

	Household Recipe	Semicommercial Formula
Sugar	1 cup	3 lbs.
Corn syrup	5 tablespoons	1 lb.
Water	¼ cup	¾ pint
Nuts (peanuts, almonds, or walnuts)	½ cup	1½ pints
Chopped dried fruit (more may be used if fruit is very dry)	¼ cup	¾ lb.
Salt	¼ teaspoon	1¼ teaspoons
Baking soda	½ teaspoon	3 teaspoons
Vanilla extract	to flavor	to flavor
Butter	2½ teaspoons	¼ lb.

Cook sugar, corn syrup, and water to 275° F (brittle crack). Add the nuts and cook until the nuts are of a butter color. Remove from the fire and add the butter. Mix well and add the fruit and salt. Allow to stand about 1 minute. Add the soda and vanilla, stir in quickly, and pour.

POPCORN-FRUIT CRISP[7]

Various combinations of dried fruits and popcorn were tested in the preparation of popcorn-fruit crisp and in most cases satisfactory results were obtained.

	Household Recipe	Semicommercial Formula
Sugar	1 cup	3 lbs.
Corn syrup	½ cup	1½ lbs.
Water	⅓ cup	1 pint
Popcorn (popped)	3 cups	4½ quarts
Butter	1½ teaspoons	3 tablespoons
Dried fruit chopped	¼ cup	¾ lb.
Salt	to flavor	to flavor

Cook sugar, corn syrup, and water to 285° F (hard crack). Add the butter, salt, and fruit, and stir. Add and stir in the popcorn. More or less popcorn than that given in the recipe may be added to suit.

[7] Suggested by Kenneth McLeod, a graduate student in Fruit Products.

UNCOOKED FRUIT CANDIES

Several of the best recipes for uncooked fruit candies developed in our experiments are given below:

Chocolate-dipped Dried Fruits.—Any variety of dried fruit may be used. If the fruit is very dry and tough first parboil it in boiling water for about one minute. Drain and allow to stand until the surface is dry.

Dip in melted chocolate as directed on page 10. A more pleasing candy is obtained if the fruit is stuffed with fondant before dipping as shown in figure 5, C and E. Pit prunes and dates, and stuff them with fondant; place fondant between the halves of dried apricots, pears, or peaches; cut figs and fill with fondant as shown in figure 5 E.

Fruit Bars.—Any variety of dried fruit can be used in this candy.

1 cup of dried fruit.
½ cup (or less) of walnuts or almonds.

Grind the fruit with the nut butter blade of a food chopper and the nuts with the medium fine blade. Mix and pass through the medium blade of the grinder. Sprinkle with a little salt as the mixture is molded to the desired thickness (usually ½ inch) in an oiled pan. Cut into pieces and dust with powdered sugar.

Shredded coconut may be used to replace all or part of the nuts. If desired, the candy may be chocolate dipped as directed on page 10. It is best when consumed fresh.

A little finely ground fresh orange peel, about two tablespoons, may be added.

Chocolate-dipped Fruit Bars.—Grind any variety of dried fruit fine, mix it with enough powdered sugar to permit kneading; mold it into pieces of suitable size and form; and dip in chocolate as directed on page 10.

"Puffed" Fruit Bars.—Candies prepared as in the foregoing recipes are apt to be too dense in texture. They can be made of more open texture or "puffed" as follows:

Warm finely ground dried fruit and nuts in a double boiler until soft and pliable. To each cupful add about ¼ teaspoonful of baking soda. Stir in thoroughly. Place in a layer about ½ inch deep on an oiled pan to harden. Cut to suitable size and coat with powdered sugar. Dip in chocolate if desired.

OTHER FRUIT CANDIES

A number of other fruit candies have been prepared, but most of these are not suitable for household preparation. Fruit juices can be used in taffy, jelly beans, gum drops, and Turkish paste. Some forms of hard candy can be stuffed with ground dried fruits. Dried fruits may be incorporated in pralines to replace part or all of the pecan nuts generally used in this candy. Various homemade fruit candies are illustrated in figure 5.

Fig. 5.—Homemade fruit candies. A. Divinity with fruit. Third piece, dried fruit marshmallow. B. Dried pears, chocolate coated. C. Dried apricots with fondant. D. Puffed fruit fondant, chocolate coated. E. Dried figs with fondant filling. F. Assorted fruit candies.

PUBLICATIONS ON CANDY MAKING

Although very little has been published on the use of fruit in candy, most cook books contain recipes for homemade candies without fruit and commercial formulae for candies without fruit are given in several books on candy making. The names of books containing formulae and general directions for candy making will be sent on request to the Fruit Products Laboratory, College of Agriculture, University of California, Berkeley, California.

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